

R E M A R K S

Reconsideration of this application, as amended, is respectfully requested.

THE SPECIFICATION

The abstract has been amended to better comply with the requirements of MPEP 608.01(b), as required by the Examiner. No new matter has been added, and it is respectfully requested that the amendments to the abstract be approved and entered, and that the objection to the abstract be withdrawn.

THE DRAWINGS

The Examiner objected to the drawings including a reference numeral (31) not mentioned in the specification.

It is respectfully pointed out, however, that reference numeral 31 is mentioned in the specification at page 15, line 9 ("main controller 31").

Accordingly, it is respectfully requested that the Examiner's objection to the drawings be withdrawn.

THE CLAIMS

Claim 1 has been amended to clarify the features of the present invention whereby the hydraulic actuator is operable via operating oil to control the tension on the crawler belt, and an

inflow of the operating oil to the hydraulic actuator is equal to an outflow of the hydraulic oil from the hydraulic actuator such that the hydraulic actuator is operable both in a direction to increase tension on the crawler belt and in a direction to decrease tension on the crawler belt under a same condition, as supported by the disclosure in the specification at, for example, page 12, line 17 to page 13, line 21.

In addition, claim 1 has been amended to clarify that the hydraulic pump is driven by the electric motor.

Still further, claim 8 has been amended to include the subject matter of claim 2 and a portion of the subject matter of claim 3 so as to provide proper antecedent basis for the recitations of the piston rod and yoke therein.

Claim 10, moreover has been amended to depend only from any one of claims 1-4.

Yet still further, claims 1-11 have been amended to make some minor grammatical improvements and to correct some minor antecedent basis problems so as to put them in better form for issuance in a U.S. patent. The informalities pointed out by the Examiner have been corrected.

No new matter has been added, and it is respectfully requested that the amendments to the claims be approved and entered and that the rejection under 35 USC 112, second paragraph, be withdrawn.

THE PRIOR ART REJECTION

Claims 1 and 4 were rejected under 35 USC 102 as being anticipated by USP 3,972,569 ("Bricknell"), claims 2 and 3 were rejected under 35 USC 103 as being obvious in view of the combination of Bricknell and USP 6,126,401 ("Latham") and claims 5-8 and 10 were rejected under 35 USC 103 as being obvious in view of the combination of Bricknell, Latham and USP 5,960,694 ("Thomas et al"). These rejections, however, are respectfully traversed with respect to the claims as amended hereinabove.

According to the present invention as recited in clarified amended claim 1, a crawler track tension adjusting device is provided for adjusting tension on a crawler belt of a crawler unit. As recited in amended claim 1, the device comprises: (a) a hydraulic actuator which is operable via operating oil to control the tension on the crawler belt, wherein an inflow of the operating oil to the hydraulic actuator is equal to an outflow of the hydraulic oil from the hydraulic actuator such that the hydraulic actuator is operable both in a direction to increase tension on the crawler belt and in a direction to decrease tension on the crawler belt under a same condition; (b) an electric motor; (c) a hydraulic pump driven by the electric motor; and (d) an operating condition detector which is disposed in a hydraulic circuit that connects the hydraulic pump to the hydraulic actuator, and which detects an operating condition of

the hydraulic actuator. And as recited in amended claim 1, the electric motor is controlled in accordance with a signal from the operating condition detector.

With the structure of the present invention as recited in amended independent claim 1, it is not necessary to provide a large hydraulic tank in a hydraulic circuit with the hydraulic actuator, because the inflow of the operating oil to the hydraulic actuator being equal to the outflow of the hydraulic oil from the hydraulic actuator. See the disclosure in the specification at, for example, page 13, lines 3-8.

In addition, since the hydraulic actuator according to the claimed present invention is driven by a hydraulic pump, which is driven by a hydraulic motor, the tension adjusting device can be provided in a closed structure that does not need to be connected to a hydraulic motor. The tension adjusting device as according to the present invention as recited in amended claim 1 can therefore be provided in a casing in which openings are provided only for wires for a controller, so that the tension adjusting device can be protected from dirt and sand. In addition, with the closed structure made possible by the tension adjusting device recited in amended claim 1, oil leakage can be minimized. See, for example, the disclosure in the specification at page 20, lines 9-23.

As recognized by the Examiner, Bricknell discloses a hydraulic system for managing the tension in an endless track of a tracked vehicle. According to Bricknell, in a hydraulic system that is normally isolated from the hydraulic pump 23 by valve 27, pilot valves 9 and 10 are open to allow hydraulic fluid to flow between the right and left side cylinders 3 and 4 and the accumulator 6. In addition, Bricknell discloses that in accordance with right turning, left turning or reversing, solenoid control valves 35 and/or 36 are open and pilot valves 9 and/or 10 are closed to allow hydraulic pressure to increase at one or both of the cylinders 3 and 4.

It is respectfully submitted, however, that the hydraulic arrangement of Bricknell does not correspond to a hydraulic actuator as recited in clarified independent claim 1, which is operable via operating oil to control the tension on the crawler belt, and wherein an inflow of the operating oil to the hydraulic actuator is equal to an outflow of the hydraulic oil from the hydraulic actuator such that the hydraulic actuator is operable both in a direction to increase tension on the crawler belt and in a direction to decrease tension on the crawler belt under a same condition.

The Examiner contends, moreover, that solenoid control valves 35 and 36 and battery 40 of Bricknell correspond to an electric motor as recited in claim 1. It is respectfully pointed

out, however, that according to clarified amended claim 1 the hydraulic pump is driven by the electric motor, and it is respectfully submitted that Bricknell does not disclose, teach or suggest this feature of the claimed present invention. Indeed, the hydraulic pump 23 of Bricknell is clearly not driven by battery 40 and solenoid control valves 35 and 36. Valves 35 and 36 of Bricknell are, in fact, positioned downstream of the hydraulic pump 23 thereof. See Fig. 1 of Bricknell.

The Examiner also contends that switches 42 and 43 of Bricknell correspond to the operating condition detecting means of the present invention as recited in claim 1. It is respectfully pointed out, however, that the operating condition detector of the present invention as recited in claim 1 is disposed in a hydraulic circuit that connects the hydraulic pump to the hydraulic actuator and detects an operating condition of the hydraulic actuator, whereby the electric motor is controlled in accordance with a signal from the operating condition detector.

By contrast, the switches 42 and 43 of Bricknell are provided in an electrical circuit including the battery 40, ground 41 and solenoid control valves 35 and 36. In addition, it is respectfully submitted that the switches 42 and 43 of Bricknell do not detect an operating condition of the hydraulic actuator. Instead, it is respectfully pointed out that according

to the teachings of Bricknell, the switches 42 and 43 are connected to vehicle direction control mechanisms so as to be actuated in response to a change in direction of the vehicle. Thus, according to Bricknell, the steering mechanism of the vehicle controls the switches 42 and 43, and the switches 42 and 43 do not detect an operating condition of a hydraulic actuator. See column 3, lines 13-22 of Bricknell.

In summary, it is respectfully submitted that Bricknell does not disclose, teach or suggest a tension adjusting a crawler track tension adjusting device for adjusting tension on a crawler belt of a crawler unit as according to the present invention as recited in amended claim 1 which comprises: (a) a hydraulic actuator which is operable via operating oil to control the tension on the crawler belt, wherein an inflow of the operating oil to the hydraulic actuator is equal to an outflow of the hydraulic oil from the hydraulic actuator such that the hydraulic actuator is operable both in a direction to increase tension on the crawler belt and in a direction to decrease tension on the crawler belt under a same condition; (b) an electric motor; (c) a hydraulic pump driven by the electric motor; and (d) an operating condition detector which is disposed in a hydraulic circuit that connects the hydraulic pump to the hydraulic actuator, and which detects an operating condition of the hydraulic actuator, wherein

the electric motor is controlled in accordance with a signal from the operating condition detector.

In addition, it is respectfully submitted that Latham and Thomas et al also do not disclose, teach or suggest these features of the claimed present invention.

In view of the foregoing, it is respectfully submitted that the present invention as recited in amended claim 1 and amended claims 2-11 depending therefrom clearly patentably distinguishes over Bricknell, taken singly or in combination with the other cited references, under 35 USC 102 as well as under 35 USC 103.

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Entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned for prompt action.

Respectfully submitted,



Douglas Holtz  
Reg. No. 33,902

Frishauf, Holtz, Goodman & Chick, P.C.  
220 Fifth Avenue - 16<sup>th</sup> Floor  
New York, New York 10001-7708  
Tel. No. (212) 319-4900  
Fax No. (212) 319-5101  
DH:iv